



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/347,690	07/02/1999	MANPREET S. KHAIRA	884.107US1	4194
21186	7590	10/03/2005		
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH 1600 TCF TOWER 121 SOUTH EIGHT STREET MINNEAPOLIS, MN 55402			EXAMINER CRAIG, DWIN M	
			ART UNIT 2123	PAPER NUMBER

DATE MAILED: 10/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/347,690

Applicant(s)

KHAIRA ET AL.

Examiner

Dwin M. Craig

Art Unit

2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 24-27 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 10, 11, 14, 16-18, 21-23 and 28 is/are rejected.
- 7) ☒ Claim(s) 3-9, 12, 13, 15, 19 and 20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 7-2-1999 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

5

Art Unit: 2123

## DETAILED ACTION

1. In view of the Appeal Brief filed on 7-7-2005, PROSECUTION IS HEREBY REOPENED. New grounds of rejection are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

It is noted by the Examiner that under the recent rules changes, the Applicant will not be required to pay a fee to re-submit an Appeal Brief.

The Examiner respectfully points out to the following excerpt from the Federal Register/Vol. 69, No. 155/Thursday, August 12, 23004/Rules and Regulations;

*Comment 44:* Two comments state that the proposed rules are unclear as to subsequent appeal procedures after prosecution is reopened subsequent to the filing of a first Notice of Appeal and Appeal Brief. Specifically, the comments question if prosecution is reopened under either § 41.39(b)(1), § 41.50(a)(2)(i) or § 41.50(b)(1), and a subsequent appeal is taken, would applicant be required to again pay the Notice of Appeal and Appeal Brief fees. The comments believe that this extra cost is unfair and burdensome to applicants because the reopening of prosecution would be the result of action by the examiner or the Board, not action by applicants. Accordingly, the comments suggest that provision should be made in the proposed rules that applicants need not twice pay the Notice of Appeal and Appeal Brief Fees in an application where those fees have already been paid but prosecution was then reopened.

*Answer:* The comment will not be adopted. The rule making did not propose to change the current procedures in this area.

Currently, once a Notice of Appeal and Appeal Brief fee has been paid in a proceeding, a second Notice of Appeal and Appeal Brief fee will not be required except if a final Board decision has been made on the first appeal. For example, in an application for patent, a Notice of Appeal and Appeal Brief fees have been paid and the examiner reopens prosecution in a new Office action, new fees are not required for an applicant to appeal from that new Office action. Another example is in an application for patent,

Art Unit: 2123

a Notice of Appeal and Appeal Brief fees have been paid and the Board in its decision makes a new ground of rejection and the applicant elects to reopen prosecution before the examiner, then new fees are required for an applicant to appeal from any new Office action by the examiner. The same procedures apply under the rules as implemented in this rule making.

2. Prosecution on the merits of this application is reopened on claims 1, 2, 10, 11, 14, 16, 17, 18, 21-23 and 28 which are considered unpatentable for the reasons indicated below: Claims 1, 2, 10, 11, 14, 16, 17, 18, 21-23 and 28 are rejected under 35 USC 102(b) as being anticipated by “HIGH PERFORMANCE PARALLEL LOGIC SIMULATION ON A NETWORK OF WORKSTATIONS” by Naraig Manjikian and Wayne M. Loucks, hereafter referred to as the *Manjikian et al.* reference.

2.1 As regards claims 1, 2, 10, 11, 14, 16, 17, 18, 21-23 and 28 the *Manjikian et al.* reference discloses on page(s) 77 and 78, Section 3 entitled, “CIRCUIT PARTITIONING” “A sequential circuit may be viewed as a collection of “cones” (Smith, Mercer and Underwood, 1987) of logic circuitry feeding the inputs of the latches. In general, the outputs of these latches feed back into the cones. Furthermore, cones may overlap if they share common circuitry, as in Figure 1. Mueller-Thuns et al. proposed an approach specifically for sequential logic circuits, which produces partitions such that only latch outputs cross partition boundaries (Mueller-Thuns et al., 1989). Their approach partitions a circuit by assigning an equal number of latches to different blocks of a partition with a depth-first traversal of the circuit, ensuring that the entire fanin cone feeding each latch is in the same block as the latch. Replication of objects in overlapping cones is introduced where necessary. There are two main advantages to this approach:

- *It is straight forward to find cones using graph traversal algorithms with a cost which is linear with respect to circuit size,*
- *Only latch outputs cross partition boundaries, requiring synchronization only at clock edges (between clock edges, all circuit activity and communication is local to each block of a partition).*

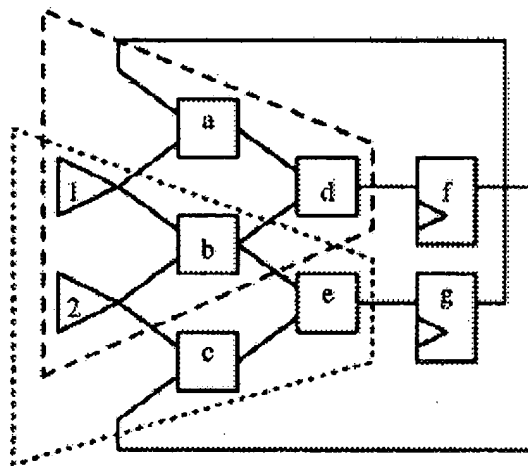
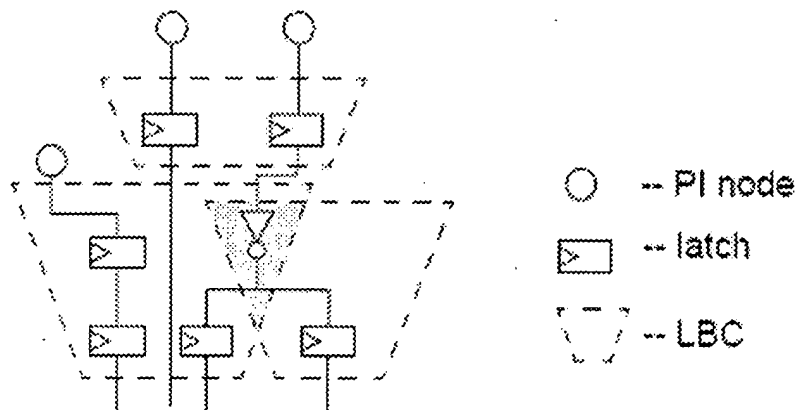


Figure 1: An example of overlapping fanin cones

The Examiner notes that above description and figure is a description of an “*extended boundary latch component*” which is clearly defined and disclosed in Applicants’ specification on pages 3, 4 and 5 of the specification and Figures 1 and 3A, 3B and 3C. More specifically the Applicant has provided the following figure,

### 3.2. Latch Boundary Decomposition and Design Hierarchy Driven Clustering

An LBC is a fanin cone that starts from latches or primary outputs (POs) and ends at latches or primary inputs (PIs). Figure 3 shows an LBC decomposition of a circuit with overlapping circuitry (shaded region).



The Examiner further notes that in the paper entitled “Logic Verification of very large circuits using Shark” which the Applicants’ have sworn behind in an Affidavit under 37 CFR § 1.131 discloses the definition of a Latch Boundary Component on page 312 as, “An LBC is a fanin cone that starts from latches or primary outputs (Pos) and ends at latches or primary inputs (PIs). Figure 3 shows an LBC decomposition of a circuit with overlapping circuitry.” The Examiner can find no difference between the expressly claimed limitations in Applicants’ current claim language, specifically and in regards to a “*Latch Boundary Component*” as claimed and the disclosed elements as cited in the *Manjikian et al.* reference.

#### Claim Rejections - 35 USC § 101

3. Claims 1-23 are rejected under 35 USC 101 because they are disembodied and merely algorithmic in their nature where these method claims could be implemented through mental

Art Unit: 2123

steps and/or constructed on paper with pencil, and are not limited to being performed by a computer or a machine. See *In re Meyer and Weissman*, 215 USPQ193 (CCPA 1982), *In re Walter*, 205 USPQ 397 (CCPA 1980), *Arshal v United States* 208 USPQ 397 (US Cl Ct 1980), *In re Sarkar* 200, USPQ 132 (CCPA 1978), *In re Musgrave*, 431 F. 2<sup>nd</sup> at 893 167 USPQ 280 (CCPA 1970) and *In re Foster*, 438 F. 2d 1011, 1013, 169 USPQ 99, 101 (CCPA 1971). (*see MPEP 2106*).

However, this rejection could be overcome by amending the method claims to include language like: "A computer implemented method", as long as the computer implementation is supported by the specification. As regards the apparatus claims, the following language would overcome the rejections, "A computing apparatus." Amendment is required.

The Examiner notes that only independent claims 1, 10, 14, 16, 17, 18 and 21 require amendment.

#### Drawings

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: In Applicants' specification on line 14 of page 7, the reference 612 does not reference any character in the drawings. The Examiner notes that there is a reference character for the number 615 in Figure 6.

Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet

Art Unit: 2123

submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

**Allowable Subject Matter**

5. Claims 24-27 are allowed. The Following is an Examiner's Reasons for Allowance, the following limitations in combination with other limitations are neither anticipated nor made obvious by the prior art, *"a dicing unit operably coupled to the processor unit, capable of executing on the processor unit, and capable of decomposing a circuit model into a plurality of extended latch boundary components, and capable of partitioning the plurality of extended latch boundary components"*.

5.1 Claims 3-9, 12, 13, 15, 19 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

**Conclusion**

6. This Office Action is Non-Final.

6.1 Claims 1, 2, 10, 11, 14, 16-18, 21-23 and 28 are rejected. Claims 3-9, 12, 13, 15, 19 and 20 are objected to. Claims 24-27 are allowed.

6.3 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dwain M. Craig whose telephone number is (571) 272-3710. The examiner can normally be reached on 10:00 - 6:00 M-F.




Art Unit: 2123

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo P. Picard can be reached on (571) 272-3749. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DMC

  
Paul L. Rodriguez 9/28/05  
Primary Examiner  
Art Unit 2125